POSTER SESSION

FOREST HEALTH MONITORING WORK GROUP MEETING

FHM Environmental Indicators
FHM Evaluation Projects
And
2003 Theme :
"Sudden Oak Death"

January 28-30, 2003
Casa Munras Garden Hotel
New Orleans, LA

The Forest Health Monitoring Program

Forest Health Monitoring is a national program designed to determine the status, changes, and trend indicators of forest condition on an annual basis. The FHM program was developed in response to increasing concern for the health of the nation's forests in light of the potential effects of atmospheric pollutants, global climate change and a variety of insect, disease, and other stresses.

The FHM program uses data from ground plots and surveys, aerial surveys, and other biotic and abiotic data sources and develops analytical approaches to address forest health issues that affect the sustainability of forest ecosystems**.**

Poster Session

The Forest Health Monitoring (FHM) Work Group Meeting was held January 28-30, 2003 in Monterey, Ca. Posters were an integral element of the meeting and provided participants an opportunity to inform participating managers and colleagues about their projects or ongoing forest health investigations. Forty-two posters were displayed on the following FHM environmental indicator categories: forest health trends using FIA plot data, sudden oak death, fire risks, insect and disease damages, ozone, soils and invasive species. There were also posters on FHM Evaluation Monitoring Projects, and FHM projects related to the 2003 theme of "Sudden Oak Death." Abstracts were submitted for most posters and are provided in the following document.

Edited by
Ed Jepsen Wis DNR
Poster Coordinator

Poster Award Winner

Randall Morin was the poster award winner at the Monterey work group meeting. He was chief author or contributing author on six posters. The posters were of uniformly high quality and contributed significantly to understanding the FHM efforts at the Northeastern Research Station at Morgantown.

Contact Information

If you have any questions or concerns regarding the poster session, please contact Ed Jepsen with the Wisconsin Department of Natural Resources (608) 266-3538.

Thanks and enjoy the abstracts and posters!

Abstract organization by Topic:

Alphabetical order - first author's last name on Abstract

Preview of the 2002 Forest Health Monitoring National Technical Report

Barbara Conkling, Mark Ambrose, John Coulston,
North Carolina State University;
Kurt H. Riitters, USDA Forest Service, Southern Research Station

Abstract

An annual, national, technical report is part of the Forest Health Monitoring (FHM) Program's analysis and reporting activity. We present some draft results from the 2002 FHM National Technical Report, which focuses on indicators from Criterion 3 – Maintenance of forest ecosystem health and vitality – from the Santiago Declaration and accompanying Criteria and Indicators. The indicator analyses include data about: abiotic, biotic, and anthropogenic disturbances; various air pollutants; and various tree measurements related to evaluating tree health.

Indiana Forest Health Monitoring: Examination of Dieback and Mortality Reported in the FHM National Technical Report 1996 – 2000

Stephen Krecik, Philip Marshall, and William Smith
Indiana Division of Forestry

Abstract

Changes reported in the "Forest Health Monitoring National Technical Report 1996 – 1999" (Conkling, Coulston, and Ambrose 2002) suggest that some Indiana forests experienced high levels of dieback and mortality when compared with national-level data trends. To better understand these findings, Indiana FHM data was analyzed: (1) geographically, (2) by species group, and (3) by forest type. Dieback increase was insignificant across almost all species and forest types. Conversely, some species groups' dieback decreased significantly. Instances of high mortality were most common in species (such as elm) susceptible to widespread, virulent diseases. This study's short time period overstates mortality, producing high dead-to-growth volume ratios especially when large-diameter trees die. This study demonstrates strengths and limitations in applying FHM data to track forest health by species and by forest type at the local level.

Predicting Forest Dieback Using Global Climate Indicators: Is it Possible?

Allan Auclair[1] and Warren Heilman[2]
[1]USDA APHIS PPQ Center for Plant Health Science and Technology, Riverdale MD
[2] USDA Forest Service North Central Research Station, East Lansing MI

Abstract

Empirical evidence supports the precept that El Nino-Southern Oscillation (ENSO) is a strong indicator of risk to climatic injury and diminished forest health in US Northern Hardwoods. This evidence came both from examining the relation of onset and recovery of individual dieback episodes within the four-year ENSO cycle, and from the correlation of major periods of dieback with the long-term (half century) ENSO trend.

Of 23 individual dieback episodes, the large majority started under neutral (61%) and La Nina (26%) conditions. This was contrary to our initial expectation that the onset of dieback would coincide with El Nino. Recovery episodes also occurred mainly under neutral (70%) conditions; 25% occurred under La Nina and almost none (5%) under El Nino phases of the ENSO cycle.

The historic ENSO trend, based on a long-term average (15 years) over the 1950 to 2002 period, showed La Nina conditions peaked in 1953, 1975 and 2002. The onset of major dieback periods in 1954 and 1976 in the Northeast coincided with these peaks. Major dieback recovery periods (starting in 1964 and 1989) coincided precisely with the El Nino troughs. A projection of the pronounced, systematic 25-year cycle observed in ENSO conditions over the past half century suggested a major interval of dieback was likely over Year 2003 through 2015. The potential for anticipatory planning of forest health management using ENSO forecasts was discussed.

A New Method for Quantifying Forest Inventory Mortality

Christopher Woodall[1], Patricia Grambsch[2] and William Thomas[3]
[1] USDA Forest Service, North Central Research Station, St. Paul, MN, 55108
[2] Associate Professor, Sch. of Public Health, U. of Minnesota, Minneapolis, MN, 55108
[3] School of Public Health, University of Minnesota, Minneapolis, MN, 55108.

Abstract

Tree mortality has typically been assessed in forest inventories through summaries of mortality by location, species, and causal agents. Although these methods have historically constituted the majority of forest mortality analyses, they are inadequate for robust assessment of mortality trends and dynamics. In order to afford a new method of analyzing tree mortality in forest inventories, survival analysis techniques were used to estimate survival and hazard functions for FIA periodic inventories in Minnesota. The study's methodology for applying survival analysis techniques to FIA inventories successfully estimates survivor and hazard functions. Classifying inventories into classes of DBH and delta DBH may facilitate application of survival analysis techniques by providing a surrogate for tree ages and vigor. Applying survival analysis techniques to forest inventories provides FIA inventory analysts with the ability to test tree mortality hypotheses, summarize regional tree mortality trends, and affords a solid foundation for development of individual tree mortality models.

Forest Health Monitoring on the Allegheny National Forest

Randall Morin[1], Andrew Liebhold[1], Kurt Gottschalk[1],
Daniel Twardus[3], Robert White[3] and Steve Horsley[4]
[1]USDA Forest Service, Northeastern Research Station, Morgantown, WV
[2]USDA Forest Service, Northeastern Area State & Private Forestry, Morgantown, WV
[3]USDA Forest Service, Allegheny National Forest, Warren, PA
[4]USDA Forest Service, Northeastern Research Station, Irvine, PA

Abstract

During the past 15-20 years, the Allegheny National Forest (ANF) has experienced four severe droughts, several outbreaks of exotic and native insect defoliators, and the effects of other disturbance agents. An increase in tree mortality has raised concerns about forest health. Historical aerial surveys (1984-98) and the 1998-2001 Forest Health Monitoring (FHM) plot data were analyzed to compare disturbed and undisturbed areas. Tree mortality and crown dieback levels were compared between undefoliated areas and areas defoliated by cherry scallopshell moth and elm spanworm. American beech mortality was compared inside and outside the beech bark disease killing front. This study illustrates the value of an intensified grid of FHM plots and demonstrates the integration of aerial survey and plot data.

Although not presented here, forest managers were also interested in describing forest-wide conditions to support current ANF issues. This consisted of mapping tree species distributions, estimating seedling and sapling stocking, summarizing FHM indicators (e.g. lichen, ozone, soils, etc.), estimating threatened and endangered species habitat. A full technical report completing the four-year analysis will be published by mid-2003.

AN INTEGRATIVE APPROACH TO ASSESSING FOREST HEALTH IN NEW YORK STATE

B. Rubin, I. Munck, N. Kraus, P. Manion, D. Leopold and D. Faber-Langendoen
State University of New York, College of Environmental Science and Forestry,
1 Forestry Dr., Syracuse, NY 13210.

Abstract

In order to assess the cumulative impact of potential forest health problems in New York, we developed a method for characterizing forest health based on a one-time random sample. Data collected include the percent cover of all understory and overstory species, typical forest inventory data, and a detailed record of disease, insect, and injury liabilities observed on each tree. We divided sampled stands into specific community types based on the species composition of all vegetation layers. For each community type, we calculated the best-fit regression line for the natural logarithm of tree stem density across diameter classes (diameter distribution). Based on the slope of the regression, we calculated the baseline mortality rate per diameter class that would sustain the current diameter distribution. Finally, we compared the baseline mortality to two indices of actual mortality, the percentage of dead trees in each diameter class, and the percentage of live trees with high levels of health liabilities. The results allow us to integrate data from forest stands throughout the state, some of which are declining, aggrading, and stable; and to differentiate between community types or individual species with normal mortality rates, and with excess mortality.

Indiana Urban Forest Health Monitoring Pilot Test – Stage 1

Matt Lake, Urban Forester
Phil Marshall, Forest Health Specialist
Indiana Division of Forestry

Abstract

The implementation of the Forest Health Monitoring (FHM) Program by the USDA Forest Service has proven effective as a sampling method to assess and detect potential health issues within rural forests. As a key component of environmental health, contributions of urban forests are becoming increasingly vital as urban sprawl escalates. Data collected from urban plots could identify trends influencing the health of urban forest ecosystems. Using Forest Inventory and Analysis (FIA) survey points, U.S. census defined urban areas, and amended FHM data collection methods; Indiana conducted a pilot test of Urban FHM Stage 1 survey procedures in 2001-2002. The Stage 1 survey uses the FHM plot design and divides the survey into 5 equal panels. The pilot test collected and analyzed data from the first panel, which totaled 30 urban locations distributed across 13 counties and 22 different cities throughout the state. The purpose of the study is to refine sampling techniques and procedures, determine validity of data and address complications encountered when utilizing FHM methods in urban environments. Results from the study demonstrated the feasibility of incorporating the FHM plot design and variables, as modified for the urban environment and collect information to analyze the urban forest health status.

Monitoring Sudden Oak Death in Oregon

Alan Kanaskie[1], Michael McWilliams[1], Jim Mair[1], Ellen Goheen[2], Everett Hansen[3], Wendy Sutton[3] and Nancy Osterbauer[4].
[1]Oregon Department of Forestry, 2600 State Street, Salem, OR 97310; 503-945-7397;
[2]USDA Forest Service; [3]Oregon State University; [4]Oregon Department of Agriculture.

Abstract

In 2001, two aerial surveys with ground verification detected 41 sites with recently killed tanoak trees, a possible indicator of Sudden Oak Death (SOD). Nine sites were confirmed positive for the SOD pathogen, Phytophthora ramorum. The infested sites all were within a 9 mi^2 area near Brookings, Curry County, Oregon. From January through August 2002, ten new sites with SOD were detected during the course of eradication and monitoring activities. Two aerial surveys, one in July 2002 (1.8 million acres) and one in October 2002 (224,000 acres) detected 155 occurrences of dead tanaoks. P. ramorum was recovered from only one of these sites. As of December 30 2002, 20 sites infested with P. ramorum, totaling 55 acres, have been identified in Oregon, and all of them are within the 9 mi^2 regulated area established in 2001. All of the known sites have been cut and burned. Monitoring around the perimeter of the sites where eradication is being attempted has detected P. ramorum occasionally, and has resulted in an enlargement of some of the eradication areas. P. ramorum also has been detected at very low levels on tanoak sprouts and in soils within some of the eradication sites, in rainwater collected in insect traps at the perimeter of one site, and in stream water draining two of the sites.

Potential susceptibility of eastern forests to sudden oak death, Phytophthora ramorum

Kurt Gottschalk, Randall Morin, and Andrew Liebhold
USDA Forest Service, Northeastern Research Station, Morgantown, WV

Abstract

Sudden oak death is caused by the fungus-like organism, Phytophthora ramorum, and was first discovered in central coastal California in 1995. Greenhouse tests of eastern oak species pin oak (Q. palustris) and northern red oak (Q. rubra) have shown these species to be just as susceptible to sudden oak death as their west coast relatives. We developed a preliminary map of the potential risk to Eastern forests in order to prepare for quarantine and management actions should the pathogen be introduced or move naturally to the Eastern US. The map was developed using FIA periodic inventory plot data from the Eastwide database. Median indicator kriging was used to develop a surface of red and live oak relative density from the point data. A forest density layer was used to mask the surface to remove non-forest areas and to reduce the proportions based on forest density. The Northeastern states conducted a shrub inventory during these periodic inventories. This shrub data was recently obtained and binary classifications were used based on presence or absence of Phytophthora ramorum shrub hosts, primarily evergreen ericaceous species. Indicator kriging was used to generate a two probability surfaces: one of shrub host presence and one of overstory host presence. These probability surfaces were multiplied to create a probability surface of host presence in the overstory and understory. The Eastern oak forests of the US appear to have plenty of susceptible hosts, both overstory and understory, that would make the establishment of Phytophthora ramorum in these forests a very serious threat.

Current and historic oak decline in the Ozark Highlands of Missouri

Rose-Marie Muzika, Richard Guyette and Steven Voelker
Department of Forestry, University of Missouri, Columbia, Missouri

Abstract

An unprecedented out break of red oak borer, Enaphalodes rufulus, has occurred in the lower Midwestern United States. Although generally not a mortality agent red oak borer appears to be a significance contributor to general oak decline and mortality. There is a need to understand the factors that influence abundance of this borer and to predict site conditions, individual tree characteristics, etc., that may influence such outbreaks. The objective of this project was to explore dendrochronology as a means to determine the role of tree age, growth and climate in long term E. rufulus activity and to quantify the historic importance of E. rufulus. In an oak (Quercus) dominated forest in Missouri, 31 trees (scarlet oak, Q. coccinea and black oak, Q. velutina) were destructively sampled, and cross sections removed at 1 m intervals. Based on wound occurrence, overall borer activity in the stand has increased dramatically over the past 70 years, particularly strongly during the past twenty-five years. The abundance of wounds was related to tree age, growth rate, and climate. Borer activity increased with tree age and mean growing season temperature, but was not related to precipitation and basal area increment. These data will be used to construct predictive models to identify vulnerable trees and stands and evaluate the importance of factors such as climate, management history, and site conditions.

Creating Large-Scale Maps of Forest Fuels Based on the FIA Inventory

Christopher Woodall and Geoffrey Holden
USDA Forest Service, North Central Research Station,
St. Paul, MN, 55108

Abstract

Strategic assessment and management of forest fuels for the purposes of fire hazard reduction requires regional-scale forest fuels maps. The Down Woody Materials Indicator of the Forest Inventory and Analysis Program, in coordination with all phases of the FIA inventory program, provides the data necessary to produce regional-scale maps of forest fuels. There are numerous methods for creating downed fuel maps. Spatial interpolations of fuel loadings map be masked with FIA Phase 1 forest/nonforest data layers to produce fuel maps. Mean fuel loadings by an ancillary data layer, such as ecological province, may be masked with the FIA Phase 1 forest/nonforest data layers as an alternative methodology. Finally, a modeling approach may be utilized where fuel loadings are predicted for all FIA phase 2 inventory plots based on the down woody materials phase 3 inventory. This poster outlines fuels mapping methods, discusses future directions, and displays preliminary fuels maps.

Fire Effects Assessment Using FIA Data in the Northern and Central Rocky Mountains, Preliminary Report 2003

D. C. Atkins, T. B. Jain, M. J. Wilson, R. A. O'Brien, and R. W. Thier

Abstract

Wildfires of 2000 and 2001 burned thousands of hectares in the Northern Rocky Mountains. Within the fire parameters, 162 Forest Inventory and Analysis (FIA) plots burned in Idaho and Montana where pre-wildfire information on forest structure, vegetation composition, soil productivity, and surface fuels was documented; thus providing a unique opportunity to assess wildfire effects on forest resources at multiple spatial scales. This is a collaborative effort among FIA-Interior West, Rocky Mountain Research Station, and FHM. To date, crews have characterized burn severity on forest floor, soils, lower vegetation, and trees. Insect activity and vegetation response was recorded, and soil samples were collected for nutrient analysis. Initial results will show post fire change in forest structure, composition, and changes in soil productivity. These data will compliment ongoing studies to evaluate the influence of pre-wildfire forest structure on post wildfire burn severity. Other results will include predicting risk of insect attack as a function of burn severity, long-term coarse woody debris recruitment, snag longevity, vegetation response, and habitat changes.

Fire risk, Swiss needle cast, and Douglas-fir crown structure in the Oregon Coast Range: A progress report

Aaron Weiskittel, Doug Maguire, and Alan Kanaskie
Oregon State University, College of Forestry, Department of Forest Resources

Abstract

Catastrophic wildfires were an important component of the Oregon Coast Range historically, and their risk of occurring may be changing due to alterations in crown and stand structure imposed by recent Swiss needle cast (SNC) epidemic. This foliar disease may intensify fire risk by enhancing vertical continuity in ladder fuels, increasing rates of fine fuel accumulation, and altering combustion rates through changes in crown bulk density and moisture content. A study was initiated to examine these relationships by quantifying changes in crown structure, tree morphology, and litterfall dynamics due to SNC. In the spring and fall of 2002, 75 trees were destructively sampled from 22 different locations, which varied in stand density, age, and SNC intensity. Ten litterfall traps were also placed within 15 plots and have been collected monthly. Components of the sample trees and litterfall are currently being dried, separated, and weighed. This information will be used to construct tree- and stand-level models for examining the distribution and dynamics of crown biomass and the changes imposed by SNC. Project completion is expected by September.

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This information will be used to construct tree- and stand-level models for examining the distribution and dynamics of crown biomass and the changes imposed by SNC. Project completion is expected by September.

Monitoring Fire Fuel Loads in Dry Hawaiian Ecosystems

Greg Asner, Flint Hughes and Amanda Warner
Carnegie Institution of Washington, Department of Global Ecology

Abstract

Ranching and settlement has brought exotic plant species to the Hawaiian Islands. Exotic grasses are now wide spread and introduce a non-native fire regime to the islands. Unchecked, this situation has a large human and environmental impact potential. In 2001, the Airborne Visible and Infrared Imaging Spectrometer (AVIRIS) acquired hyperspectral imagery of select areas to study this growing problem. We have assembled a diverse dataset including multispectral imagery, air photos, soil and climate information, and field canopy characteristics. With these data, we have begun to develop methods for mapping fire fuel loads and predicting areas of fire potential. We have used the ranch at Puu Waa Waa as a testing site for Monte Carlo Spectral Mixture Analysis as a method to derive fraction of non-photosynthetic vegetation, photosynthetic vegetation, and soil. This method has been used successfully in semi-arid systems in the mainland South West to map fractional cover. Preliminary results show this to be a viable method and model input for mapping fire fuel loads in the Hawaiian Islands.

Butternut (Juglans cinerea L.) distribution for estimating butternut canker mortality impacts and potential reintroduction of resistant trees

Kurt Gottschalk[1], Randall Morin[1], Michael Ostry[2] and Andrew Liebhold[1]
[1]USDA Forest Service, Northeastern Research Station, Morgantown, WV
[2]USDA Forest Service, North Central Research Station, St. Paul, MN

Abstract

Butternut (Juglans cinerea L.), a widespread but rare tree, is being affected by a lethal canker disease caused by the Sirococcus clavigignenti-juglandacearum fungus. The fungus was probably introduced from outside North America and is possibly spread by insects. The first butternut deaths were reported in 1967 and butternuts of all ages are dying throughout the range of butternut in North America. Mortality from the fungus has resulted in the proposed listing of butternut as a threatened species in several states. We evaluated the distribution of live and dead butternut trees in the eastern United States using U.S. Forest Service Forest Inventory and Analysis (FIA) plot data. Butternut occurrence was then classified by ecoregion province and section levels. Significant differences in butternut occurrence existed at both levels. Kriging was used to derive a probability map of butternut occurrence across the eastern United States. This map was then mulitplied by a forest density layer, resulting in an adjusted probability map of butternut occurrence in eastern forests. Candidate areas for resistant butternut reintroduction have been identified by this analysis. In several ecoregion provinces and sections the presence of damaged and diseased butternuts was discovered. Future efforts will focus on classifications of butternut presence using the limited site factors available in the FIA data.

Mapping susceptibility and spread associated with the gypsy moth

Randall Morin[1], Andrew Liebhold[1], Andrew Lister[2],
Kurt Gottschalk[1] and Daniel Twardus[3]
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[2]USDA Forest Service, Northeastern Research Station, Newtown Square, PA
[3]USDA Forest Service, Northeastern Area State & Private Forestry, Morgantown, WV

Abstract

The gypsy moth was originally introduced near Boston in 1868 or 1869, it has been slowly expanding its range mostly to the south and west. The gypsy moth is a polyphagous insect; North American populations feed on over 300 different shrub and tree species. In order to plan for the management of the gypsy moth over the next decade and beyond, there is a need to delimit the distribution of susceptible stands in areas that are currently uninfested. Invasions by exotic insects and diseases are one of the most important threats to the stability and productivity of forest ecosystems around the world. One of the most important steps in the development of effective strategies for management of alien species is to evaluate the risk of future impacts from specific exotic organisms. The generic activity, "risk assessment" is considered an important component to management of exotics both before and after their arrival in new habitats. Our research focuses on estimating the expected geographical extent of gypsy moth through 2025 and which areas within that extent will be the most at risk. We used USDA Forest Service Forest Inventory and Analysis (FIA) data to create an estimated surface of basal area that is composed of species preferred by the gypsy moth and historical survey data to model gypsy moth spread.

Ground Checking Aerial Survey Polygons Identified as Douglas-fir Beetle Caused Damage in Washington in 2001 and 2002

Karen Ripley, Robert Backman, Jeffrey Moore
Washington Department of Natural Resources

Abstract

Ground checking is an important technique to evaluate aerial survey results and improve observer accuracy. In 2001 and 2002, 117 Douglas-fir beetle mortality polygons were ground checked in northeastern Washington the same year they were digitally mapped by the USDA Forest Service and Washington Department of Natural Resources' cooperative annual aerial survey. The ground checker was provided with a paper map that depicted the polygon location, shape, damage agent, number of trees affected, and latitude/longitude of the polygon center. Half of the polygons were located on the map then sought on the ground. Half were seen on the ground then the map was checked.

Results: Sixty-three percent correspondence occurred between mapped polygons and mortality observed on the ground. Polygon location was mapped 96% accurately when polygons exceeded 100 trees. Mortality groups observed on the ground but not mapped (n = 39), were small, averaging just 20 trees. Tree species and damage agent were mapped with excellent accuracy (95% and 96%). The DBH of 424 Douglas-fir beetle killed trees was measured. It averaged 21.24 inches.

Mapping susceptibility and spread associated with hemlock wooly adelgid

Randall Morin[1], Andrew Liebhold[1], Andrew Lister[2],
Kurt Gottschalk[1] and Daniel Twardus[3]
[1]USDA Forest Service, Northeastern Research Station, Morgantown, WV
[2]USDA Forest Service, Northeastern Research Station, Newtown Square, PA
[3]USDA Forest Service, Northeastern Area State & Private Forestry, Morgantown, WV

Abstract

The hemlock woolly adelgid, Adelges tsugae, is native to Asia and was first introduced to North America in British Columbia in the 1920's and was later discovered in the Shenandoah Mountains of Virginia in the 1950's. It has gradually been expanding its range, largely to the North. In the eastern US, the adelgid's principal host is eastern hemlock, Tsuga canadensis. Thus, the hemlock wooly adelgid is likely to cause considerable damage in the future as it expands into areas with large quantities of hemlock. Invasions by exotic insects and diseases are one of the most important threats to the stability and productivity of forest ecosystems around the world. One of the most important steps in the development of effective strategies for management of alien species is to evaluate the risk of future impacts from specific exotic organisms. The generic activity, "risk assessment" is considered an important component to management of exotics both before and after their arrival in new habitats. Our research focuses on estimating the expected geographical extent of hemlock woolly adelgid through 2025 and which areas within that extent will be the most at risk. We used USDA Forest Service Forest Inventory and Analysis (FIA) data to create an estimated surface of eastern hemlock basal area.

Loblolly Pine Decline, Leptographium spp. and Root-Feeding Insects

L. Eckhardt[1], J. Jones[1], N. Hess[2], R. Menard[2] and E. Carter[3]
[1]Department of Plant Pathology and Crop Physiology, Louisiana Agricultural Experiment Station, Louisiana State University Agricultural Center, Baton Rouge, LA;
[2]US Forest Service, Forest Health Protection, Pineville, LA;
[3]US Forest Service, Southern Research Station, Auburn University, AL.

Abstract

Loblolly pine decline, characterized by an expanding area of declining and dead trees, is becoming increasingly prevalent in central Alabama. A three year study was conducted to determine the fungal, insect, and/or soil parameters associated with this syndrome. Hylastes salebrosus, Hylastes tenuis, Pachylobius picivorus and Hylobius pales were significantly more abundant in declining plots than in healthy Pinus taeda L. plots. These root and lower stem-infesting insects consistently carried Leptographium terebrantis, L. procerum, L. serpens, and L. lundbergii. Root sampling revealed high levels of root damage and mortality, staining and infestation with Leptographium species. This below-ground mortality precedes the above-ground symptoms of short chlorotic needles, sparse crowns, and reduced radial growth followed by mortality. A sequence of interactions among this complex of organisms and abiotic factors is proposed as the cause of loblolly pine decline. The data from this research also strongly suggests that loblolly pine decline, as a disease syndrome, is distinct from littleleaf disease.

Mapping susceptibility and spread associated with beech bark disease

Randall Morin[1], Andrew Liebhold[1], Andrew Lister[2],
Kurt Gottschalk[1] and Daniel Twardus[3]
[1]USDA Forest Service, Northeastern Research Station, Morgantown, WV
[2]USDA Forest Service, Northeastern Research Station, Newtown Square, PA
[3]USDA Forest Service, Northeastern Area State & Private Forestry, Morgantown, WV

Abstract

Also known as beech scale Nectria canker, beech bark disease is an insect-fungus complex composed of the European scale insect (Cryptococcus fagisuga) and the exotic canker fungus Nectria coccinea var. faginata or the native Nectria galligena that kills or injures American beech (Fagus grandifolia). The disease results when a Nectria fungus infects the bark through the feeding wounds caused by beech scale insects. Invasions by exotic insects and diseases are one of the most important threats to the stability and productivity of forest ecosystems around the world. One of the most important steps in the development of effective strategies for management of alien species is to evaluate the risk of future impacts from specific exotic organisms. The generic activity, "risk assessment" is considered an important component to management of exotics both before and after their arrival in new habitats. Our research focuses on estimating the expected geographical extent of beech bark disease through 2025 and which areas within that extent will be the most at risk. We used USDA Forest Service Forest Inventory and Analysis (FIA) data to create an estimated surface of American beech basal area and historical survey data to model beech bark disease spread.

Rapid Early Detection of Two Exotics in Michigan: Beech Bark Disease and Hemlock Wooly Adelgid

Roger Mech Michigan Department of Natural Resources

Unable to Attend Meeting No poster presented

Abstract

Beech bark disease was discovered in Michigan in 2000. Losses during the first phase of the disease are estimated at 7.5 million trees for beech greater than 9 inches in diameter. Hemlock wooly adelgid-infested nursery stock was intercepted and destroyed in 2001. Hemlock wooly adelgid has the potential to severely reduce or eliminate eastern hemlock from Michigan.

A rapid early detection survey was conducted for hemlock wooly adelgid and beech scale across the state's hemlock and beech resource. Surveys were done in nurseries that sell hemlock, high-use recreation areas, and large, contiguous forest stands of hemlock and beech. The objectives were to determine if hemlock wooly adelgid was established in Michigan, and to determine whether beech bark disease had moved beyond the previously established 'core' areas.

Hemlock wooly adelgids were not detected in any survey plots. Beech scale were not found outside the core areas established by the Michigan Beech Bark Disease Monitoring and Analysis System.

In addition, resource professionals were trained to identify and report beech bark disease and hemlock wooly adelgid. An interactive website will allow the public to report incidence of these exotic forest pests. Information is being used to develop GIS-based hemlock wooly adelgid risk models.

Use of an artificial inoculation technique to identify American beech trees with resistance to the beech scale insect

Jennifer Koch and Dave Carey
USFS Northeastern Research Station

Abstract

Increasing the number of resistant beech trees while reducing the proportion of susceptible trees is currently thought to be the best management approach to minimize the overall impact of beech bark disease (Mielke et al., 1986). Even in heavily infested areas, trees that remain clear of scale may be "escapes" and not truly resistant. Previous work by David Houston (1982) reported an artificial inoculation technique that confirmed the resistance of older, scale-free trees and successfully infested one-year old seedlings. We are currently setting up experiments designed to determine if this technique will be an effective tool in distinguishing resistant from susceptible American beech trees. To directly compare resistant and susceptible individuals we are using three different tree sources: 1) root sprouts, both naturally occurring and artificially induced through wounding, 2) grafted material, and 3) seedlings, both from open-pollinated sources (half-sibs) and from controlled cross-pollinations (full-sibs). Our initial efforts have resulted in the collection of 1200 seeds from controlled-cross pollinations and 5000 open-pollinated seeds. Insect collection traps have been set to confirm the resistance of the parent trees, to confirm the resistance of clusters of clonal trees, and to collect eggs for use in challenge experiments of seedlings and grafted trees.

Evaluating distribution and structure of epidemic populations of Sphaeropsis sapinea

Glen Stanosz[1, 2] and Denise Smith[1]
Departments of [1]Plant Pathology and [2]Forest Ecology and Management

Abstract

Recent unprecedented outbreaks in the northcentral United States have led to recognition of two distinct groups of the pine shoot blight and canker pathogen Sphaeropsis sapinea. These groups (referred to as A and B) differ greatly in aggressiveness on pines. It has further been shown that aggressive A group strains can persist on or in asymptomatic trees and later proliferate to cause disease. The distribution of these groups and their relative frequency in both epidemic and nonepidemic nursery and forest situations is poorly understood. We are evaluating: 1) S. sapinea as a cause of red and jack pine damage and mortality in recently detected epidemics; isolates are being acquired and S. sapinea populations are being characterized using molecular markers; 2) the structure of S. sapinea populations in nonepidemic situations, especially as it occurs beyond the range of historical reports of significant damage; 3) the potential for populations of aggressive A groups strains to persist with (and be distributed on) asymptomatic hosts in federal, state, and private conifer nurseries. Results will allow the reevaluation of the strategies and measures currently employed (but failing) to reduce the impact of Sphaeropsis shoot blight and canker diseases of pines.

Softwood Dieback and Jack Pine Budworm Defoliation in Wisconsin: An analysis of survey and FIA plot data

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Abstract

Average percent dieback of softwood tree crowns in 1999 was rated between 10 and 18 percent on FIA plots in northwest Wisconsin where defoliation by the jack pine budworm has been surveyed. Digitized polygons of areas of jack pine defoliation were created for each year from 1993 to 1998 and consolidated into 3 areas: 1) budworm present but no defoliation noted, 2) defoliation level low, and 3) defoliation level high. FIA plots within each of the 3 levels were located by performing a spatial overlay of the polygons on 1983 and 1996 FIA plot locations. FIA plot data was used to analyze the correlation between known levels of defoliation and factors known to increase the risk of jack pine to defoliation and subsequent dieback. Low site quality, open stand structure and a high jack pine component were all correlated with stands that incurred high levels of defoliation. FIA plot data and survey data together support the conclusion that the jack pine budworm contributed to high levels of softwood dieback.

Monochamus spp. (Coleoptera: Cerambycidae) as Primary Colonizers of Live Jack Pines (*Pinus banksiana*)

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Steven Katovich (USDA, Forest Service, State and Private Forestry, St. Paul, Mn),
William Mattson (USDA-FS, North Central Experiment Station, Rhinelander, Wi), and
Steven Seybold (USDA, Forest Service, Pacific Southwest Research Station, Davis, Ca)

Abstract

The July 4th 1999 severe windstorm in the Superior National Forest of Minnesota presents a unique opportunity to study the temporal-spatial colonization patterns of sub-cortical beetles that may cause decline and mortality of residual trees within wind-disturbed and undisturbed stands. Bark (Scolytidae) and wood-boring (Cerambycidae, Buprestidae) beetles are prime candidates expected to invade wind-disturbed landscapes that include fallen dead, standing dead, leaning (dead/live), and undamaged standing live trees.

In July 2001, we established research plots in each of three wind-disturbed and undisturbed sites, and tagged 20 standing live and 10 each of fallen dead, leaning (dead/live), and standing dead jack pines with the assumption that some of these trees might advance from one temporal-spatial class to the next with time. Trees have been monitored and sampled for external and internal signs of beetle colonization activity for two years, and tree DBH and height have also been recorded.

Between 2001 and 2002, 12 of the 300 trees changed temporal-spatial classes and 10 of these were in wind-disturbed plots. Furthermore, 15 of 30 leaning trees died in wind-disturbed plots and 14 of 30 leaning trees died in undisturbed plots. In 2001, we had observed initial signs (oviposition scars) of only cerambycid beetles (primarily *Monochamus* spp.) colonizing five standing live jack pine trees in wind-disturbed (3 cases) and undisturbed (2 cases) plots.

In 2002, six standing live trees had already died, and *Monochamus* spp. activity increased on the remaining standing live jack pines in the plots. We observed oviposition scars from female *Monochamus* spp. (in the absence of bark beetles, primarily *Ips* spp.) on ~25% (28/114) of trees, *Ips* spp. alone colonizing <1% (1/114) of trees, and both *Monochamus* spp. and *Ips* spp. co-colonizing ~12% (14/114) of standing live jack pines. We also observed cerambycid adults during extensive maturation feeding on young jack pines.

In 2002 *Monochamus* spp. alone colonized a significantly greater number of trees in wind-disturbed than undisturbed plots and a significantly greater number of standing live trees than each of the remaining classes. No such differences were observed for *Ips* spp. alone. There were also significant differences in the number of trees co-colonized by *Monochamus* spp. and *Ips* spp. within the four temporal-spatial classes but not between the two disturbance categories. Density of oviposition scars created by female cerambycids was negatively correlated with tree DBH, whereas no significant relationship was found with tree height.

Overall, our preliminary results challenge the current hypothesis that scolytids are always the initial colonizers among sub-cortical insects on coniferous trees, and support the need for some type of post-wind-disturbance treatments that may protect residual trees in jack pine forest stand.

White Pine Blister Rust On State Lands In Washington

Daniel Omdal and Melanie Kallas Ricklefs

Abstract

During the summer of 2002, we conducted a white pine blister rust (WPBR) survey in western white pine across state lands in Washington. All surveyed units hosted WPBR. Incidence of WPBR in western white pine was 42% overall, and ranged from a low of 38% in the South Puget Sound Region to a high of 55% in the Northwest Region of the state. East of the crest of the Cascades, nearly half of the trees examined (47%) were infected by Cronartium ribicola J.C. Fisch, the causal agent for WPBR. The percent of uninfected trees decreased and the percent of trees with stem cankers increased with increasing dbh (up to the 14-15.9" dbh class). Nevertheless, mortality and topkill were very low across all sampled units.

Monitoring White Pine Blister Rust Spread and Establishment in the Central Rocky Mountains

Jeri Lyn Harris, James T. Hoffman, Kelly F. Sullivan, Meg E. Halford, and Maria Newcomb - Rocky Mountain Region FHP (Lakewood, CO) and Intermountain Region FHP (Boise, ID)

Forest health specialists detected the spread of white pine blister rust disease, caused by an introduced fungus (*Cronartium ribicola*), into Colorado in 1998. After study of several FHM, FIA, and research databases for information about Central Rocky Mountains white pines, we designed a study to look at the distribution and severity of white pine blister rust disease in the Central Rocky Mountains.

Several accessible sites of white pines (limber, bristlecone, and whitebark) were surveyed in Colorado, Wyoming, Idaho, and New Mexico. Accessible sites were locations with a ½ day of hiking from a road. Standard inventory methods were used. FHP crews of the Rocky Mountain Region and the Intermountain Region surveyed over 70 white pine sites in the Central Rockies. Unfortunately, survey work was limited in these forests when many sites containing white pines were closed due to wildfire restrictions/considerations.

White pine average site descriptions for these areas were sites with a western slope aspects and elevations from 8000 to 10,000. Colorado white pines occurred in multi-aged, multi-species stands – most frequently with lodgepole pine, then Douglas-fir, aspen, and blue spruce. *Ribes cereum* was the most common *Ribes* spp.; *Ribes inerme* was found on only 1 out of 38 study sites in Colorado. In Wyoming and Idaho, white pine blister rust disease was found in 29 of 32 study sites and in only 1 of 38 study sites in Colorado. Disease severity was significantly higher in Idaho and Wyoming ranging from 1 – 64% of the white pines infected. The average percent infection incidence on these Idaho and Wyoming study sites was 20%. Further data analysis and reports of white pine blister rust disease in the Central Rocky Mountains will be written in 2003.

Evaluation of Eastern White Pine Condition in Vermont: 2001

B. Burns, K. Decker and D.Bergdahl

Abstract

A variety of symptoms have been observed on eastern white pine in northern New England over the past decade. Site, weather, and biotic agents have been associated with these symptoms. New interest in cultivating Ribes has increased concern about white pine blister rust. A survey was conducted in 2001 to evaluate white pine condition in Vermont and to examine factors related to symptom development.

White pine stands were located on randomly selected 1:8000 color- infrared photos. These were acquired in 2000 for the Vermont Hardwood Health Survey. At each of 21 stands, four 1/24th acre subplots were evaluated on the ground. In addition, 10 young white pine were rated in nearby regenerating stands.

Eighty-nine percent of the overstory white pine in mature stands were rated as healthy, while 6% were dead. In young stands, 93% were healthy. White pine weevil was the most common biotic agent observed. Symptoms were present on 66% of live pines in mature stands. Weevil occurrence was not related to crown vigor. Pine bark adelgid was present on 16% of pines, and was more common on healthy trees. Three percent of white pines in mature stands had blister rust symptoms, compared to 14% in young stands.

White Pine Decline Risk Assessments In Maine

William Livingston[1], Gregory Granger[1] and Clark Granger[2],
[1]University of Maine, Orono; [2]Maine Forest Service, Augusta

Abstract

White pine decline is characterized by thinning of the crown and mortality (26% of basal area) in pole-size stands in southern Maine. Most dead trees had their last year of growth in 1996 or 1997. Recent studies have demonstrated that the drought of 1995 incited the decline, and that potential rooting depth of less than 12 inches is a key predisposing factor. Rooting depth can be limited by plow pans, high water tables, shallow bedrock, or fine texture soils overlaying course texture soils. Many white pine regenerated on these soils after 80% of the farms in Maine were abandoned between 1910 and 1950. We are trying to get an estimate as to how many white pine stands in southern Maine (York, Cumberland, southern Oxford counties) are at risk to white pine decline due to shallow rooting depths. We're overlaying digitized soil maps with satellite cover types to indicate potential areas where white pine is growing on soil types that may have a restrictive layers. About 60-100 sites will be selected at random for sampling in 2003. White pine site index, stand density, and potential rooting depth will be measured in 4 subplots at each location. In addition, the soil maps were used to assign a soil type to each of 56 FIA plots in York county, and 31 plots were on soils that could have rooting restrictions.

Ozone Biomonitoring - Looking to the Future

Ed Jepsen (Wis DNR), Dr. Gretchen Smith (U Mass) and Dan Stratton (SRS)

Abstract

The new national ozone grid encompasses all major forest ecosystems, climate zones and ozone exposure regimes. A minimum of 938 plots located in 871 of the 1228 sampling polygons were surveyed in 2002. About 10 % of the polygons in states on the annualized inventory were not surveyed because of minimal forests, significant crop areas, deserts, wetlands and/or major urban areas. Approximately 70 extra plots were sampled in five northern region states thus effectively intensifying the base grid.

Implementation of the new grid is increasing species (minimum 3 species) and plant (30 individuals/species) count per plot thus enhancing the inter-plot estimates of ozone stress in forest ecosystems.

Analysis of detection monitoring data has documented phenomena previously identified in the peer-reviewed literature, such as a strong relationship between ozone exposure, water stress and foliar injury. The program has identified forest communities in the northeast with a high incidence of foliar injury. Comparing FIA growth and damage data from plots across these stress gradients may help quantify the effects on forests.

Specific objectives for the ozone biomonitoring program include the following :

1. Integrate ozone elements into ISM and urban studies
2. Seek evaluation monitoring funding for regional studies on ozone stress, forest productivity and soil moisture relationships.
3. Conduct fumigation studies to increase the number of bioindicator species
4. Improve field data reliability through additional QA testing
5. Increase analysis for state/national publications and scientific articles
6. Use web based tools for dissemination of data and analytical products

Sources of error in field assessments of O3 injury in western yellow pine

Nancy Grulke
USDA Forest Service, PSW Research Station

Abstract

The generalized effects of ozone exposure on plants are well known, but translating responses developed under controlled conditions to effective field tools can be complex. There are two methods generally used for assessing yellow pine (ponderosa and Jeffrey) response to O3 exposure in the Sierra Nevada: the Ozone Injury Index (OII) and the Forest Pest Management (FPM) assessment. For both methods, chlorotic mottle and needle retention form the basis of the assessment. Field examples of how these attributes change within the growing season, between years, with cumulative O3 exposure or uptake, at sites differing with nitrogen deposition and drought stress are given for both ponderosa and Jeffrey pine. The data presented suggests that cross-site comparisons in foliar O3 injury may be confounded by nitrogen deposition, because it co-varies with O3 exposure. Canopy position significantly affects the expression of attributes used in O3 injury assessment. Specific suggestions are offered for future, repeated field assessments of O3 injury for consistency, and to help interpret historical data sets.

A statistical tool for identifying biological threshold responses to O3 exposure or uptake.

Nancy Grulke
USDA Forest Service, PSW Research Station

Abstract

The generalized additive model was developed by statisticians nearly a decade ago, but its application in assessing the simultaneous effects of multiple environmental stressors on biological response attributes has occurred only in the last couple of years. This statistical model was applied to seasonal trends in CO2 uptake of ponderosa pine, a western conifer sensitive to atmospheric oxidants, but any responsive biological attribute such as biomass, bole growth, chlorotic mottle, or an assessment index could be used. CO2 uptake was chosen for the analysis because it is a sensitive, within-growing season response attribute linkable to tree biomass. This tool allowed us to be able to (1) test whether cumulative O3 exposure or uptake was a better metric; (2) quantitatively compare what cumulative oxidant level was deleterious to ponderosa pine among sites; and (3) test whether drought stress protected or deleteriously affected ponderosa pine. Cumulative O3 uptake was a better metric than exposure, but its use in regional assessments is impractical. Populations of ponderosa pine exposed long term to atmospheric oxidants had higher thresholds for deleterious effects on CO2 uptake (160 to 180 ppm h O3 accumulated over the growing season) than a population in an atmospherically clean site (110 ppmh). In late summer, drought acted synergistically with O3 exposure to reduce CO2 uptake of ponderosa pine.

Impact of ground-level ozone on trees in the Great Smoky Mountains National Park

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Abstract

Great Smoky Mountains National Park (GRSM), encompassing over 206,000 hectares of area in the states of Tennessee and North Carolina, is the most visited National Park in the United States. The Park contains a wide diversity of plants and animals representative of a large region of the eastern US. Ozone exposures are high in the Park, and have increased significantly over the past decade, with possible detrimental effects on the vegetation, and in particular, forest trees. Yellow-poplar and black cherry trees previously cored (1994) and identified regarding ozone sensitivity were re-cored (2001) at three sites within the GRSM. Twenty trees/species (10 sensitive, 10 non-sensitive)/ site were cored. Some differences existed between the original analysis using cores collected in 1994 compared with those collected in 2001. Growth for both species was affected by site, but no site X sensitivity interactions were observed. Black cherry radial growth did not differ by ozone sensitivity groups during any time period analyzed. Yellow-poplar varied by sensitivity group during the period 1990-1994 (ozone-sensitive trees exhibited less radial growth), but no differences in growth were observed from 1997-2001. Yellow-poplar grew better from 1997-2001 compared with the period 1990-1994, but black cherry grew less.

Soil Vital Signs: A New Index for Assessing Forest Soil Health

Michael Amacher[1] and Katherine O'Neill[2]
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[2]USDA-FS North Central Research Station

Abstract

Numerous soil properties are measured to assess forest soil quality or health as part of the Forest Inventory and Analysis (FIA) program. Without advanced training in soil science, potential users find it difficult to use the soil indicator database to assess forest soil quality. To overcome this limitation, we developed a new index that integrates the measured physical and chemical properties of forest soils into a single number that serves as the soil's "vital sign" of overall soil quality or health. Each individual physical and chemical property is assigned an index number depending on whether it is above or below an assigned threshold value. Thresholds were selected on the basis of known physiological responses of vegetation to soil properties or were based on the relative distribution of soil properties with respect to the entire population of FIA soil samples. All the individual soil property indexes are summed to obtain an overall index and the final summary index is expressed as a percentage of the total number of measured properties. Soils with low index numbers have a lower overall soil quality and imply a greater risk of decline in forest health. Soils with high index numbers have little risk of decline.

Combining Data from the Soil and Down Woody Material Indicators to Estimate Carbon Storage at the Regional Scale

Katherine O'Neill, Christopher Woodall, Michael Amacher and Geoffrey Holden
USDA-FS, North Central Research Station, FIA

Abstract

Sequestration of carbon in soils and forest biomass has been proposed as a mechanism to offset CO_2 emissions from the burning of fossil fuels. The Phase-3 Detection Monitoring plots are the only nationally consistent data available for estimating changes in carbon storage in forest soils, the forest floor, and downed woody debris. However, the sampling design and compilation procedures for the Soil Quality and Down Woody Materials (DWM) indicators were developed and implemented separately, and as a result, are not entirely compatible. Complicating factors include: (1) variables are collected on different portions of the plot; (2) methods are designed for aggregation at different levels (plot vs regional); (3) for the soils indicator, both the number of samples and the collection method may vary from plot to plot; and (4) several of the estimated carbon pools overlap between the two indicators and care needs to be taken to avoid double counting C. This paper will outline an initial approach for combining C estimates from the soil and DWM indicators, highlight the potential limitations with this approach, and discuss the additional research or refinements to the protocol that may be needed to improve C estimates and streamline data collection/compilation.

COLE (Carbon On-Line Estimator)

Patrick Proctor

Abstract

COLE (Carbon On-Line Estimator) is a web based model developed by NCASI in cooperation with the USDA Forest Service. COLE allows users simple and powerful access to forest plot data using a standard web browser. COLE provides a dynamic tool for assessing carbon levels with forest inventory and analysis (FIA) data. The poster will discuss COLE's uses, interface, progress, and future plans.

Strategies for Managing Noxious and Invasive Plants in Alaska 2002 progress report

Michael Shephard
Alaska Region Forest Health Protection

Abstract

In the past many biologists and land managers thought Alaska's remoteness offered protection from infestations. However, Alaska has several well-established infestations of noxious and invasive plants, such as Japanese knotweed. New invasive plants, such as garlic mustard, are becoming established every year. These plants threaten to invade the urban and wildland forests of Alaska. The costs can be low if we quickly identify, control and eradicate infestations.

Some 2002 S&PF Accomplishments
Coordination & education:
•Funded a statewide coordinator (through Cooperative Extension Service).
•Facilitated numerous TV, newspaper and radio stories dealing with exotic species.
•Initiated a web-based Field Guide to noxious and other weeds of Alaska.

Inventory and Monitoring:
•Developed statewide Alaska Exotic Plants Clearinghouse with methods, datasheets, metadata, and templates for submitting data.
•Started a pilot Weed Scout program in Anchorage –>1,000 data points collected –has assisted in a better understanding of which portions of Anchorage have serious problems.
•Funded a survey of 7 southeast Alaska communities surrounded by the Tongass (Sitka Conservation Society -560 data points collected)

Future Work:
Coordination: Continue to work very closely with other agencies

Education: Create a ranking system for the invasive plant species currently in the State, and those that are most likely to show up. Expand the web-based Field Guide to add more information on control options.

Inventory & Monitoring: Continue inventory focus for one more year to fill some of the glaring gaps within the State, especially in the Interior, and portions of Southcentral Alaska. Expand the functionality of the statewide database.

Research: Write proposals with cooperators to study the effect of Vicia and Melilotus on most at risk natural communities within the state.

Control & Eradication: Assist Juneau effort to control and eradicate Garlic mustard and Japanese knotweed. Encourage Municipality of Anchorage and Chugach State Park to begin Bird vetch control measures

Additional information is available from :
Michael Shephard, 907.743.9454 or mshephard@ fs.fed.us or
Alaska Region Forest Health Protection web-page http://www.fs.fed.us/r10/spf/fhp/

Amber-marked Birch Leafminer

Mike Shephard

Abstract

The amber-marked birch leafminer (BLM), *Profenusa thomsoni* (Konow), (Hymenoptera: Tenthredinidae) had not been identified from Alaska before 2002. Since 1996, intense birch leafminer defoliation became very noticeable throughout many parts of the Anchorage Bowl. Approximately 30,000 acres of defoliated birch were aerially detected in 2002. Extensive defoliation of 1000 birch was also observed on Eielson Air Force base near Fairbanks in 2002. This leafmining sawfly is no doubt a recent introduction into the state, probably via imported ornamental birch. At this point in time, damage is not considered serious because defoliation occurs late in the growing season. Since this insect is a recent introduction into Alaska, however, we do not know the full "potential" of its impact. Homeowner concern for this defoliation is high resulting in increased pesticide use.

The amber-marked birch leafminer was introduced, possibly from Europe, into the northeastern U.S. in the early 1900's. Since then, it has become established throughout many parts of Canada. The amber-marked leafminer was first reported in Edmonton, Alberta, Canada in the early 1970's. This leafminer grew to become the most important exotic leafminer on Edmonton's birch trees. In the early 1990's a highly specific biological control agent, a holarctic ichneumonid parasitic wasp, *Lathrolestes luteolator* (Gravenhorst) (Hymenoptera: Ichneumonidae), appeared in Edmonton. Not only did this wasp cause the twenty year long outbreak to collapse, it has made this exotic leafminer rare, curing the need for one of the most entrenched and widely practiced insecticide treatments in Edmonton.

We do not believe we have *L. luteolator* in Alaska. Extensive trapping conducted in the Anchorage bowl did not detect this parasite. In the absence of an efficient biological control agent, BLM populations will continue to spread unchecked throughout many parts of south-central and interior Alaska's birch forests.

A cooperative biological control program is being planned for 2003-2005. Participating agencies include: USDA Forest Service, Canadian Forestry Service, USDA APHIS, State of Alaska Division of Forestry, and the Municipality of Anchorage. This proposed biological control program would entail the collection of parasites from Canada in 2003; the release of the parasites in Alaska in 2004; and the monitoring of parasite establishment in 2005.

For additional information contact Ed Holsten 907.743.9453 or eholsten@ fs.fed.us or Alaska Region Forest Health Protection web-page http://www.fs.fed.us/r10/spf/fhp/